

CLAIMS:

1. An interactive multiple-dimensional imaging system, comprising:
 - means for interactively selecting a view perspective with respect to a multiple-dimensional data set;
 - means for analyzing the multiple-dimensional data set to identify at least one structure-of-interest represented in the data set, the means for analyzing responsive to the view perspective;
 - means for identifying the foremost portion of the structure-of-interest responsive to the means for analyzing;
 - means for associating a set of data points responsive to the means for identifying to generate a faceplate; and
 - means for applying the faceplate to the multiple-dimensional data set.
2. The system of claim 1, wherein the means for analyzing is responsive to a multiple-dimensional data set comprising spatial information encompassing the structure-of-interest over time.
3. The system of claim 1, wherein the means for associating a set of data points identifies a two-dimensional plane-of-interest within the multiple-dimensional data set.
4. The system of claim 3, wherein the two-dimensional plane-of-interest is orthogonal to the view perspective.
5. The system of claim 3, wherein the two-dimensional plane-of-interest comprises a pixel having an opacity value that exceeds a threshold.
6. The system of claim 5, wherein the pixel comprises information responsive to light transmitted through the structure-of-interest.
7. The system of claim 1, wherein the means for associating a set of data points is responsive to a configurable input.
8. The system of claim 1, wherein the means for applying the faceplate comprises a mathematical combination of pixel values associated with the faceplate with corresponding voxel values associated with the multiple-dimensional data set.
9. The system of claim 1, wherein the means for applying the faceplate comprises selectively replacing voxel values from the multiple-dimensional data set with corresponding pixel values associated with the faceplate.

10. The system of claim 9, wherein pixel values associated with the faceplate are adaptively adjusted in response to at least one voxel value associated with an adjacent voxel from the multiple-dimensional data set.
11. The system of claim 1, further comprising:
means for generating a time-based sequence comprising a plurality of composite views of the faceplate and the multiple-dimensional data set.
12. The system of claim 11, further comprising:
means for rendering the time-based sequence of composite views at a refresh rate suitable for observing moving structures of a heart. ✓
13. A method for viewing information within a multiple-dimensional data set, comprising:
identifying a view axis that intersects a multiple-dimensional data set;
modifying the multiple-dimensional data set to align one of the dimensions of the multiple-dimension data set responsive to the view axis;
locating a portion of a structure-of-interest with respect to a distance along a vector parallel to view axis;
associating a set of pixels with a faceplate; and
generating a composite view in accordance with the faceplate.
14. The method of claim 13, wherein identifying a view axis comprises responding to a viewer instruction.
15. The method of claim 13, wherein modifying the multiple-dimensional data set comprises spatially adjusting a reference axis in accordance with the view axis.
16. The method of claim 13, wherein locating a portion of a structure-of-interest comprises identifying a two-dimensional plane-of-interest orthogonal to the view axis.
17. The method of claim 16, wherein the two-dimensional plane-of-interest is responsive to a viewer instruction.
18. The method of claim 13, wherein associating a set of pixels with a faceplate comprises comparing a voxel value associated with a voxel along a ray cast line with a threshold.
19. The method of claim 13, wherein generating a composite view comprises mathematically combining a voxel value associated with the faceplate with a corresponding voxel value associated with the multiple-dimensional data set.

20. The method of claim 13, further comprising:
repeating the modifying step over a plurality of time-variant values from the multiple-dimensional data set.
21. A multiple-dimensional imaging system, comprising:
a memory-storage unit configured to store a multiple-dimensional data set;
a multiple-dimensional image processor communicatively coupled to the memory-storage unit, the image processor configured to convert the multiple-dimensional data set to a two-dimensional representation in a plane orthogonal to an operator-identified view axis;
and
an image-rendering device communicatively coupled to the image processor, the rendering device configured to display the two-dimensional representation of a volume-of-interest contained within the three-dimensional data set, wherein the two-dimensional representation is responsive to a faceplate orthogonal to the view axis that includes information associated with a structure-of-interest.
22. The system of claim 21, further comprising:
an operator interface configured to selectively generate a view axis responsive to a representation of the volume-of-interest.
23. The system of claim 22, wherein the multiple-dimensional image processor generates the faceplate in accordance with an operator selected preference.
24. The system of claim 21, wherein the multiple-dimensional image processor mathematically combines a voxel value associated with the faceplate with a corresponding voxel value associated with the multiple-dimensional data set.
25. The system of claim 21, wherein the memory-storage unit contains a time-variant three-dimensional data set and the image-rendering device generates a sequence of two-dimensional representations at a refresh rate suitable for observing moving structures within the volume-of-interest.
26. A computer-readable medium having processor-executable instructions thereon which, when executed by a processor, direct the processor to:
apply an input indicative of an operator preference for a spatial arrangement of a representation of a volume-of-interest;
generate a faceplate corresponding with a structure within the volume-of-interest along a view axis responsive to the operator preference; and

combine the faceplate with information from a multiple-dimensional data set to generate a two-dimensional array of pixels representing the structure.

27. The computer-readable medium of claim 26, wherein the faceplate comprises a two-dimensional plane-of-interest within the multiple-dimensional data set.

28. The computer-readable medium of claim 27, wherein the two-dimensional plane-of-interest is orthogonal to the view axis.

29. The computer-readable medium of claim 27, wherein the two-dimensional plane-of-interest comprises a pixel having an opacity value that exceeds a threshold.

30. The computer-readable medium of claim 29, wherein the pixel comprises information responsive to light transmitted through the structure-of-interest.

31. The computer-readable medium of claim 26, wherein the means for associating a set of data points is responsive to a configurable input.

32. The computer-readable medium of claim 26, wherein information from the multiple-dimensional data set is mathematically combined with information defining the faceplate in response to an operator configurable parameter.